

# **Tea consumption and breast cancer risk in a cohort of women with family history of breast cancer**

**Authors:** Dongyu Zhang, Hazel B. Nichols, Melissa Troester, Jianwen Cai, Jeannette T. Bensen, Dale P. Sandler

## Table of Contents

<b>Supplementary Table 1.</b> Sensitivity analysis restricting to women with follow-up period>6 months. ....	<b>3</b>
<b>Supplementary Table 2.</b> Hazard ratios (HR) and 95% confidence intervals (CI) for the association between tea consumption and breast cancer risk excluding women with missing values for serving size.....	<b>4</b>
<b>Supplementary Table 3.</b> Hazard ratios (HR) and 95% confidence intervals (CI) for the association between tea consumption and ductal carcinoma in situ (DCIS) and invasive breast cancer risk. ....	<b>5</b>
<b>Supplementary Table 4.</b> Hazard ratios (HR) and 95% confidence intervals (CI) for the association between tea consumption and breast cancer risk stratified by number of first degree relatives with breast cancer. ....	<b>6</b>

**Supplementary Table 1.** Sensitivity analysis restricting to women with follow-up period>6 months.

	Total cohort (n=45,573)	Breast cancer diagnoses <sup>1</sup> (n=2,670)	Person-years	HR (95% CI) <sup>2</sup>	HR (95% CI) <sup>3</sup>
<b>Black tea (cups/week)</b>					
0	8,407 (18.4%)	494 (18.5%)	65,446.6	REF	REF
<1	15,530 (34.1%)	932 (34.9%)	123,605.5	0.99 (0.88, 1.10)	0.94 (0.84, 1.05)
1-<5	10,167 (22.3%)	600 (22.5%)	80,842.8	0.97 (0.86, 1.09)	0.93 (0.82, 1.05)
≥5	11,469 (25.2%)	644 (24.1%)	91,274.2	0.91 (0.81, 1.02)	0.89 (0.78, 1.01)
				<i>p-trend=0.07</i>	<i>p-trend=0.13</i>
				<i>p-overall=0.33</i>	<i>p-overall=0.33</i>
<b>Green tea (cups/week)</b>					
0	20,052 (44.0%)	1,167 (43.7%)	159,541.1	REF	REF
<1	15,606 (34.2%)	1,000 (37.5%)	123,826.1	1.09 (1.00, 1.19)	1.09 (1.00, 1.19)
1-<5	5,871 (12.9%)	310 (11.6%)	46,215.6	0.90 (0.80, 1.02)	0.91 (0.80, 1.03)
≥5	4,044 (8.9%)	193 (7.2%)	31,586.3	0.81 (0.70, 0.94)	0.82 (0.70, 0.96)
				<i>p-trend&lt;0.01</i>	<i>p-trend&lt;0.01</i>
				<i>p-overall&lt;0.01</i>	<i>p-overall&lt;0.01</i>

Abbreviations: HR: hazard ratio, CI: confidence interval.

<sup>1</sup>Breast cancer included invasive and non-invasive breast cancer.

<sup>2</sup>HR is the age-adjusted hazard ratio.

<sup>3</sup>HR is the multi-adjusted hazard ratio, and the multivariable model included black and green tea simultaneously.

Variables adjusted: race, body mass index, education, income, smoking status, alcohol consumption, energy intake, physical activity, meat consumption, sleep duration, caffeine intake, healthy eating index, history of birth control pill utilization, personal cancer history, and number of first degree relatives with breast cancer.

**Supplementary Table 2.** Hazard ratios (HR) and 95% confidence intervals (CI) for the association between tea consumption and breast cancer risk excluding women with missing values for serving size.

	Total cohort (n=44,065)	Breast cancer diagnoses <sup>1</sup> (n=2,698)	Person-years	HR (95% CI) <sup>2</sup>	HR (95% CI) <sup>3</sup>
<b>Black tea (cups/week)</b>					
0	8,304 (18.9%)	510 (18.9%)	68,583.9	REF	REF
<1	14,774 (33.5%)	927 (34.3%)	124,736.8	0.99 (0.89, 1.10)	0.94 (0.84, 1.06)
1-<5	9,840 (22.3%)	609 (22.6%)	82,911.1	0.97 (0.86, 1.09)	0.93 (0.82, 1.06)
≥5	11,147 (25.3%)	652 (24.2%)	94,096.2	0.91 (0.81, 1.02)	0.89 (0.78, 1.01)
				<i>p-trend=0.06</i>	<i>p-trend=0.10</i>
				<i>p-overall=0.30</i>	<i>p-overall=0.31</i>
<b>Green tea (cups/week)</b>					
0	19,659 (44.6%)	1,204 (44.6%)	165,758.4	REF	REF
<1	14,821 (33.6%)	979 (36.3%)	124,755.6	1.07 (0.98, 1.17)	1.06 (0.97, 1.16)
1-<5	5,690 (12.9%)	321 (11.9%)	47,510.8	0.92 (0.81, 1.04)	0.92 (0.81, 1.04)
≥5	3,895 (8.9%)	194 (7.2%)	32,303.2	0.80 (0.69, 0.94)	0.81 (0.69, 0.94)
				<i>p-trend&lt;0.01</i>	<i>p-trend&lt;0.01</i>
				<i>p-overall&lt;0.01</i>	<i>p-overall&lt;0.01</i>

Abbreviations: HR: hazard ratio, CI: confidence interval.

<sup>1</sup>Breast cancer included invasive and non-invasive breast cancer.

<sup>2</sup>HR is the age-adjusted hazard ratio.

<sup>3</sup>HR is the multi-adjusted hazard ratio, and the multivariable model included black and green tea simultaneously.

Variables adjusted: race, body mass index, education, income, smoking status, alcohol consumption, energy intake, physical activity, meat consumption, sleep duration, caffeine intake, healthy eating index, history of birth control pill utilization, personal cancer history, and number of first degree relatives with breast cancer.

**Supplementary Table 3.** Hazard ratios (HR) and 95% confidence intervals (CI) for the association between tea consumption and ductal carcinoma in situ (DCIS) and invasive breast cancer risk.

	Invasive breast cancer as outcome		DCIS as outcome		<i>p-heterogeneity</i>
	No. cases/overall	aHR (95% CI)	No. case/overall	aHR (95% CI)	
<b>Black tea (cups/week)</b>					
0	388/8,423	REF	113/8,423	REF	0.54
<1	731/15,538	0.93 (0.83, 1.05)	201/15,538	0.91 (0.79, 1.04)	
1-<5	481/10,170	0.92 (0.81, 1.05)	115/10,170	0.87 (0.72, 1.05)	
≥5	504/11,473	0.88 (0.77, 1.02)	136/11,473	0.81 (0.63, 1.04)	
		<i>p-trend=0.12</i>		<i>p-trend=0.43</i>	
		<i>p-overall=0.39</i>		<i>p-overall=0.42</i>	
<b>Green tea (cups/week)</b>					
0	920/20,067	REF	248/20,067	REF	0.85
<1	788/15,613	1.09 (0.99, 1.19)	207/15,613	1.08 (0.96, 1.21)	
1-<5	236/5,879	0.93 (0.81, 1.06)	79/5,879	0.91 (0.74, 1.12)	
≥5	160/4,045	0.81 (0.68, 0.97)	31/4,045	0.79 (0.60, 1.05)	
		<i>p-trend=0.01</i>		<i>p-trend=0.01</i>	
		<i>p-overall&lt;0.01</i>		<i>p-overall&lt;0.01</i>	

Abbreviations: HR: hazard ratio, CI: confidence interval, DCIS: ductal carcinoma in situ

Joint Cox model was used to investigate association for tea consumption, and invasive breast cancer and DCIS were competing risks.

A total of 45,604 participants were included for analysis, which included 2,104 invasive breast cancer and 565 DCIS.

HR is the multi-adjusted hazard ratio, and the multivariable model included black and green tea simultaneously.

Variables adjusted: race, body mass index, education, income, smoking status, alcohol consumption, energy intake, physical activity, meat consumption, sleep duration, caffeine intake, healthy eating index, history of birth control pill utilization, personal cancer history, and number of first degree relatives with breast cancer.

**Supplementary Table 4.** Hazard ratios (HR) and 95% confidence intervals (CI) for the association between tea consumption and breast cancer risk stratified by number of first degree relatives with breast cancer.

	Had 1 first degree relative with breast cancer		Had >1 first degree relatives with breast cancer		
	No. cases/overall	aHR (95% CI)	No. case/overall	aHR (95% CI)	<i>p-interaction</i>
<b>Black tea</b>					
<b>(cups/week)</b>					
0	337/6,183	REF	183/2,259	REF	0.64
<1	623/11,445	0.91 (0.79, 1.04)	359/4,143	1.01 (0.83, 1.21)	
1-<5	416/7,467	0.95 (0.81, 1.10)	217/2,740	0.90 (0.73, 1.11)	
≥5	434/8,471	0.86 (0.74, 1.01)	240/3,036	0.91 (0.73, 1.12)	
		<i>p-trend=0.15</i>		<i>p-trend=0.29</i>	
		<i>p-overall=0.27</i>		<i>p-overall=0.51</i>	
<b>Green tea</b>					
<b>(cups/week)</b>					
0	801/14,814	REF	429/5,315	REF	0.84
<1	673/11,450	1.07 (0.96, 1.19)	373/4,214	1.10 (0.95, 1.27)	
1-<5	208/4,330	0.88 (0.75, 1.03)	121/1,563	0.98 (0.80, 1.21)	
≥5	128/2,972	0.79 (0.65, 0.96)	76/1,086	0.88 (0.68, 1.13)	
		<i>p-trend&lt;0.01</i>		<i>p-trend=0.14</i>	
		<i>p-overall&lt;0.01</i>		<i>p-overall=0.26</i>	

Abbreviations: aHR: adjusted hazard ratio, CI: confidence interval

Adjusted for race, education, income, body mass index, smoking status, alcohol consumption, energy intake, physical activity, meat consumption, sleep duration, caffeine intake, healthy eating index score, history of birth control pill utilization, personal cancer history, and alternate tea type (green or black) consumption.

Interaction was tested by Wald test.  $P < 0.05$  indicated statistical significance.

For women having 1 first degree relative with breast cancer, 33,566 women were included for analysis.

For women having >1 first degree relative with breast cancer, 12,178 women were included for analysis.